

LISTING OF CLAIMS

CLAIMS

What is claimed, is:

(1) (Currently amended) A sound source localization system comprising:

a sound reflecting element for generating delay information corresponding to a relative position between a sound source and sound collecting means, said sound reflecting element having a sound reflecting surface, sound reflecting from said sound reflecting element to reflect a sound wave generated from the sound source inherently corresponding to a sound source position and to enable recording and processing of acoustic data;

a storage part for recording and storing the acoustic data collected via a said sound reflecting element; and

a sound source localization part for acquiring a sound source position, employing the acoustic data on which said delay information is superposed.

(2) (previously presented) The sound source localization system according to claim 1, wherein said sound reflecting element is formed as a spheroid associated with the relative position between the sound source and sound collecting means to generate said delay information intrinsic to said relative position.

(3) (previously presented) The sound source localization system according to claim 1, wherein said sound source localization part comprises a standard template storage part for storing a standard template containing intrinsic delay information generated by a white noise sound source, a background noise template storage part for storing a background noise template, a residual generation part for calculating a residual from said acoustic data,

employing said standard template and said background noise template, and a selection part for selecting the standard template giving the least residual, employing the generated residual.

(4) (original) The sound source localization system according to claim 3, wherein said standard template storage part stores the standard template and the sound source position giving said standard template in association.

(5) (original) The sound source localization system according to claim 1, wherein said sound source localization system comprises at least one sound reflecting element, and simultaneously acquires positional data of the sound source including a range to the sound source, an azimuth and an elevation as said relative position.

(6) (Currently amended) A sound source localization method ~~for~~ comprising acquiring the position of a sound source under the control of an information processing apparatus, said ~~method~~ step of acquiring comprising:

a step of collecting ~~the~~ acoustic data with delay information superposed corresponding to a relative position between a sound source and sound collecting means, employing a sound reflecting element wherein a reflecting surface of the sound reflecting element is designed as an envelope made from a plurality of spheroids formed by rotating a plurality of ellipses having two focal points corresponding to the sound source and the sound collecting mean respectively, around an axis connecting the focal points;

a step of storing said collected acoustic data in a storage part; and

a step of reading the acoustic data with said delay information superposed and acquiring said relative position of said sound source designated by said delay information.

(7) (Currently amended) The sound source localization method according to claim 6,

wherein said delay information is generated by reflection from a spheroid associated with said relative position between the sound source and sound collecting means, and said delay information is generated intrinsic to said relative position, and further comprising using the sound source position at an angle in a system with a small number of microphones.

(8) (previously presented) The sound source localization method according to claim 6, wherein said sound source localization step comprises a step of reading out a standard template from a standard template storage part for storing the standard template containing delay information intrinsic to said relative position generated by a white noise sound source, a step of reading out a background noise template from a background noise template storage part for storing the background noise template, a step of calculating a residual from said acoustic data, employing said standard template and said background noise template, and a step of selecting the standard template giving the least residual, employing the generated residual.

(9) (original) The sound source localization method according to claim 6, wherein said selection step comprises a step of referring to the selected standard template and acquiring the sound source position corresponding to said standard template.

(10) (original) The sound source localization method according to claim 6, further comprising a step of simultaneously acquiring the range, azimuth and elevation as said relative position from said acquired sound source position to said sound source.

(11) (withdrawn) A sound reflecting element for generating delay information corresponding to a relative position between a sound source and sound collecting means, wherein a reflecting surface of said sound reflecting element has an envelope made from a plurality of spheroids that are formed by rotating a plurality of ellipses having the distance between the focal points corresponding to the distance from said sound source to said sound collecting means around an axis connecting said focal points.

(12) (withdrawn) The sound reflecting element according to claim 11, wherein said plurality of ellipses are generated in relation with the elevation between said sound source and said sound collecting means and flatter as said elevation is greater.

(13) (withdrawn) The sound reflecting element according to claim 11, wherein said reflecting surface is formed as an enveloping surface of said plurality of spheroids that are generated by rotating a corresponding ellipse around the axis connecting said focal points.

(14) (withdrawn) A formation method of a sound reflecting element comprising:
generating delay information corresponding to a relative position between a sound source and sound collecting means;

a step of generating a plurality of spheroids by rotating an ellipse having the distance between the focal points corresponding to the distance from said sound source to said sound collecting means around an axis connecting said focal points; and

a step of forming a reflecting surface by generating an enveloping surface of said plurality of spheroids.

(15) (withdrawn) The formation method of the sound reflecting element according to claim 14, wherein said plurality of ellipses are generated in relation with the elevation between said sound source and said sound collecting means and flatter as said elevation is greater.

(16) (previously presented) The sound source localization system according to claim 1, wherein said sound reflecting element is an element for generating the delay information corresponding to a relative position between a sound source and sound collecting means, wherein a reflecting surface of said sound reflecting element has an envelope made from a

1 plurality of spheroids that are formed by rotating a plurality of ellipses having the distance
2 between the focal points corresponding to the distance from said sound source to said
3 sound collecting means around an axis connecting said focal points.

4 (17) (previously presented) The sound source localization system according to claim 16,
5 wherein said plurality of ellipses are generated in relation with the elevation between said
6 sound source and said sound collecting means and flatter as said elevation is greater.

7 (18) (previously presented) The sound source localization system according to claim 16,
8 wherein said reflecting surface is formed as an enveloping surface of said plurality of
9 spheroids that are generated by rotating a corresponding ellipse around the axis
10 connecting said focal points.

11 (19) (previously presented) The sound source localization system according to claim 1,
12 wherein said sound reflecting element is an element generated by a formation method
13 comprising:

14 generating delay information corresponding to a relative position between a sound source
15 and sound collecting means;

16 a step of generating a plurality of spheroids by rotating an ellipse having the distance
17 between the focal points corresponding to the distance from said sound source to said
18 sound collecting means around an axis connecting said focal points; and

19 a step of forming a reflecting surface by generating an enveloping surface of said plurality
20 of spheroids.

21 (20) (previously presented) The sound source localization system according to claim 19,
22 wherein said plurality of ellipses are generated in relation with the elevation between said
23 sound source and said sound collecting means and flatter as said elevation is greater.

(21) (new) The sound source localization method according to claim 6, wherein the plurality of ellipses is generated in relation with an elevation between the sound source and the sound collecting means and is flatter as the elevation is greater.

(22) (new) The sound source localization method according to claim 6, wherein the reflecting surface is designed as an enveloping surface of the plurality of spheroids generated by rotating a corresponding ellipse around the axis connecting the focal points.

(24) (new) The sound source localization system according to claim 1, wherein a path difference between the sound wave directly collected from the sound source and a reflected wave reflected from the reflecting surface of the sound reflecting element, and a shape of the sound reflecting element is configured to relate the position of sound source with the path difference.

(25) (new) The sound source localization system according to claim 1, wherein the sound reflecting element is configured as a set of elliptic curves, and further comprising using the sound source position at an angle in a system with a small number of microphones.

(26) (new) The sound source localization system according to claim 25, wherein a cross section of the reflecting surface is configured using an ellipse in which the sound source is disposed at a first focal point and the microphone is disposed at a second focal point the ellipse.

(27) (new) The sound source localization system according to claim 26, wherein a sound wave starting from the first focal point is collected at the second focal point, even when reflected at any other position.

(28) (new) The sound source localization system according to claim 1, further comprising means for employing a path difference for the localization of the sound source; and

1 moving a microphone relative to the sound reflecting element and the sound source, as the
2 sound source is moved.

3 (29) (new) A position location method comprising enabling estimation of a sound source
4 position at an angle in a system with a small number of microphones, the step of enabling
5 comprising:

6 forming a reflecting surface as an enveloping surface of a spheroid in which a
7 position of sound collecting means and a sound source position are the focal points;
8 generating a delay amount corresponding to a sound source position of a reflected
9 wave of a direct wave;
10 measuring the delay amount between the direct wave and the reflected wave; and
11 acquiring the sound source position from the result of the step of measuring.